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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,762	03/18/2004	Dong Soo Lee	122988-05007285	4699
22429 7590 11/08/2007 LOWE HAUPTMAN HAM & BERNER, LLP 1700 DIAGONAL ROAD SUITE 300 ALEXANDRIA, VA 22314			EXAMINER LIN, PHYOWAI	
			ART UNIT 2613	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/802,762	Applicant(s) LEE ET AL.	
	Examiner PHYOWAI LIN	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yutaka et al., "Novel Modulation and Detection for Bandwidth-Reduced RZ Formats Using Duobinary-Mode Splitting in Wideband PSK/ASK Conversion" @2002 IEEE in view of F. Liu et al., "A novel chirped return-to-zero transmitter and transmission experiments," European Conference on Optical Communication 2000, Munich, Germany, Vol. 3, pp. 113-114, Sept 3 - 7 2000.

Regarding to claim 1, Yutaka et al. disclose an apparatus for generating a Carrier-Suppressed Return-to-Zero (CS-RZ) signal (see FIG.3), comprising:

a mixer generating a modulator input by mixing data (NRZ data signal) with a half clock signal (B/2 clock) (see FIG.3);

a Low Pass Filter (LPF) band-limiting the modulator input data, which has been provided from the mixer, into low frequency band data (see page 2068, right column lines 27-31 and FIG.3 where in the modulator input data is filtered by LPF into low frequency band data);

a driver amplifier amplifying the modulator input data generated by the mixing of the mixer and the band-limiting of the LPF (see page 2068, right column lines 27-31 and FIG.3 where in the modulator input data is boosted by amplifier for amplifying the input data signal) ; and

an external modulator (MZ modulator) generating a CS-RZ signal, in which phases of adjacent pulses are inverted, by applying bias voltage to the modulator input data, which has been amplified by the driver amplifier, to be placed at a null point of a transfer function of the external modulator (see page 2068, right column lines 4-10, lines 12-15 and FIG.3 where in a push-pull type Mach-Zehnder modulator can generate duobinary CS-RZ signal with phases are inverted by applying bias voltage to the modulator at the transmission null point).

In FIG.3 of Yutaka et al. the LPF is after the amplifier; but the LPF of the applicant is before the amplifier. However, such limitation is merely a matter of design choice and would have been obvious in the system of Yutaka et al. Since LPF is functioning for filtering out as low frequency band data, the LPF can be installed before or after the amplifier and both position are functionally equivalent. Therefore, to install the LPF before or after the amplifier would have been a matter of obvious design choice to one of the ordinary skill in the art.

Even though, Yutaka et al. disclose that an NRZ data signal from the optical duobinary data modulator drives the modulator MZ#2 and a half clock signal from two-mode-beat pulse generator drives the modulator MZ#1 respectively. Yutaka et al. fail to specifically disclose a mixer to mix the NRZ data signal with the half clock signal and couple the two signals into a single Mach-Zehnder modulator with CW light input.

However F. Liu et al. in the same field of endeavor, disclose a system in which a mixer (2:1 selector see FIG.1) is used to mix the NRZ data signal with clock signal. After mixing the two signals, then the mixed signal is coupled into the single MZ modulator with CW light input (see FIG.1).

By mixing the NRZ data signal with clock signal into the 2:1 selector and using a single MZ modulator instead of two MZ modulators, F. Liu et al. provide a cost effective system and low losses in the transmission system.

Therefore, it would have been obvious to one of the ordinary skill in the art at the time invention was made to use the 2:1 selector to mix the NRZ data signal and half clock signal and coupling the mixing signals into the single MZ modulator as taught by F. Liu et al. to generate the duobinary CS-RZ signal so that a cost-effective and low losses system can be achieved.

Regarding to claim 2, Yutaka et al. and F. Liu et al. disclose everything claimed as applied above (see claim 1). In addition, F.Liu et al. disclose wherein the mixer (2:1 selector) adjusts logical data "0" to data 0 V and adjusts a clock signal to symmetrically swing around 0 V (see paragraph under title Structure of the CRZ transmitter: lines 6-8 where in the 2:1 selector controls the data signal to 0 V (falling edge) and clock signal to swing around 0 V (rising edge)).

Therefore it would have been obvious to one of the ordinary skill in the art at the time invention was made to use the 2:1 selector to control the NRZ data signal and clock signal into particular voltage range because it would allow to have accurate and useful design choice for mixture output before coupling into an modulator for modulation.

Regarding to claim 3, Yutaka et al. and F. Liu et al. disclose everything claimed as applied above (see claim 1). In addition, Yutaka et al. disclose wherein: the band limiting reduces an optical spectrum bandwidth of the CS-RZ signal while reducing noise of the signal; the decrease of the optical spectrum bandwidth improves dispersion characteristics of the optical signal; and the bandwidth of the LPF is adjusted to increase dispersion tolerance of the optical signal while minimizing distortion of the optical signal (see Abstract, lines 14-20 and see FIG.3 where in using filter (LPF) in generating duobinary CS-RZ signal system can achieve reducing the bandwidth of optical spectrum so that minimizing distortion of the optical signal as well as increase dispersion tolerance of optical signal).

Regarding to claim 4, Yutaka et al. and F. Liu et al. disclose everything claimed as applied above (see claim 1). In addition, Yutaka et al. disclose wherein the driver amplifier performs amplification so that logical data "0" becomes 0 V and logical data "1" becomes $\pm V_{pi}$ (see FIG.3 and FIG.4 (b) where in the amplifier amplifies the NRZ data signal as making the logical data 0 and 1 as 0 and $\pm V_{pi}$).

Regarding to claim 5, Yutaka et al. and F. Liu et al. disclose everything claimed as applied above (see claim 1). In addition, Yutaka et al. disclose wherein the LPF is an electrical filter designed to reduce the spectrum of the optical signal and improve the dispersion characteristics of the optical signal (see Abstract, lines 14-20 and see FIG.3 where in using filter (LPF) in generating duobinary CS-RZ signal system can achieve reducing the bandwidth of optical spectrum so that minimizing distortion of the optical signal as well as increase dispersion tolerance of optical signal).

Citation of Pertinent Prior Art

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hayee et al. (US Patent Number 6980746) disclose the system for generating CS-RZ signal by mixing data and half clock signal with single modulator.

Response to Arguments

4. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground of rejection.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHYOWAI LIN whose telephone number is (571) 270-1659. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PWL

07/19/07


KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER